



Geochronology. The University of California, Davis will fill a permanent, tenure track, faculty position at the assistant professor level beginning Fall, 1985. Candidates having interests in isotope geochronology and/or the geochronology of economic deposits are especially encouraged to apply but other specialties in geochronology will be considered. A PhD degree is required. Responsibilities include teaching at the undergraduate and graduate levels, and research in geochronology.

Applicants should submit complete vita, a statement of research and teaching interests and the names of three references. Deadline for application is January 15, 1985. Inquiries and applications should be directed to: Dr. Howard W. Davis, Department of Geology, University of California, Davis, CA 95616. The University of California is an equal opportunity/affirmative action employer.

Coastal Physical Oceanographer. The College of Marine Studies invites applications for a tenure track position in physical oceanography. Applicants should have a background in coastal or estuarine physical oceanography, with experience in observational work at sea. The successful applicant will have the opportunity to develop an independent oceanographic research program which may include carrying out physical oceanographic research within existing interdisciplinary research programs in Delaware Bay or the adjacent continental shelf. Facilities available include the 120-foot coastal research vessel Cape Henlopen. Teaching at the graduate level will be required, and the successful candidate will be expected to develop a funded research program involving graduate students. It is anticipated that the appointment will be at the assistant professor level. Applications from more senior persons are welcome. Applicants should send curriculum vitae, previous reprints, and the names of three references to the chairman of the search committee: Dr. Richard G. Gosselin, Oceanography Program, College of Marine Studies, UNIVERSITY OF DELAWARE, Newark, DE 19716, (503) 451-2105. The closing date for applications is November 30, 1984.

The University of Delaware is an equal opportunity/affirmative action employer.

Sedimentology/University of Illinois. Applications are solicited for a tenure-track position at the Assistant Professor level in sedimentology. A creative individual is sought who will develop a research program that complements our existing programs in sedimentology (currently emphasizing source properties), geodynamics, tectonics, and rock/metal physics. An excellent research environment and outstanding facilities are available both in the Department and the University. A Center for Super Computer Research and Development is presently being formed at the University. In addition, our campus is the site of a proposed regional computational facility. Opportunity exists to interact with the department of Tectonics and Applied Mechanics. The position is expected to be filled as early as Fall, 1985. Salary is commensurate with experience; a PhD is required. The successful candidate is expected to participate in teaching and advising at the graduate and undergraduate levels. For equal consideration, interested individuals should send curriculum vitae, reprints, and publications, statements of research interests and names of three or more references by December 15, 1984 to:

Professor Albert T. Haur
Department of Geology
University of Illinois at Urbana-Champaign
1301 W. Green Street
Urbana, Illinois 61801
Tel: 817/835-7282 or 435-3542.

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SOLAR PHYSICIST - BRANCH CHIEF

SPACE SCIENCE LABORATORY
NASA-MARSHALL SPACE FLIGHT CENTER
Huntsville, Alabama 35812

The Chief-Terrrestrial Division expects to appoint a solar physicist to the position of Chief of the Solar Science Branch. The Branch's full members (six Ph.D.s), visitors (NRC post-docs, summer faculty, etc.), contractors, and associates are involved in an active research program in solar physics. A broad range of research topics is being pursued at present, with emphasis on the formation and structure of the transition region, the occurrence and consequences of distorted magnetic fields and their accompanying electric currents, and numerical modeling of coronal evolution and interplanetary dynamics. Branch activities include the operation of a vector solar magnetograph, the analysis of data from the Ultraviolet Spectrometer and Polarimeter (UVSP) instrument aboard the Solar Maximum Mission Satellite, and the assisting of MSFC engineers with the scientific aspects of solar missions (e.g., Sunab, Advanced Solar Observatory and Pihoc/Occultor Facility). In addition, x-ray telescope development work is underway. Computing facilities are currently being upgraded and soon will be unsurpassed anywhere. Collaborations with external colleagues are encouraged, and there is the opportunity to train and advise graduate students.

The appointee must be a recognized research scientist with administrative interests. In addition to performing his or her own research, the appointee will be expected to guide the work of the Branch and to pursue new directions as appropriate. It will be the responsibility of the Branch chief to recruit new Branch members, post-docs, and visitors as opportunities arise. The Branch chief will oversee the submission of proposals for funding and will be expected to work closely with the Office of Solar and Heliospheric Physics at NASA Headquarters. Salary will be GS-14 or 15 (42,928 - 65,642) depending on experience and qualifications.

Forward resumes and references to the following address no later than January 15, 1985.

Dr. C. R. Chappell
ESS1
NASA/Marshall Space Flight Center
Huntsville, AL 35812

NASA

U. S. Citizenship Required Equal Opportunity Employer

LEADER, ATMOSPHERIC AEROSOL SAMPLING AND ANALYSIS GROUP

Ames Research Center (35 miles south of San Francisco) is seeking a senior investigator and leader for the atmospheric aerosol group. The group develops and flies advanced instruments to investigate specific problems, such as stratospheric-tropospheric exchange, the composition of the natural and perturbed troposphere, atmosphere-biosphere interactions, and climatic effects of aerosols and clouds.

Specified qualifications include: 1) Ability to advance, advocate, and defend programs. Ability to motivate, develop, evaluate, and recruit subordinates. Knowledge of current theories regarding important atmospheric aerosol problems and the relevance of measurements to these theories (double-weighted); 2) Ability to direct and conduct all phases of research projects that advance the state of knowledge of atmospheric aerosols; 3) Ability to design and develop state-of-the-art aerosol sampling/sensing instrumentation within cost and time constraints; 4) Skill in communicating schedules, plans, scientific goals, and operational constraints involved in flight missions. U.S. citizenship and Ph.D. or equivalent in atmospheric physics or chemistry are required. Permanent position in federal service. Projected salary: \$44,430 to \$67,940 commensurate with experience/education. For further information regarding requirements and application procedures, write 71-84A at the address below or phone (415) 694-5776. Formal applications must be filed by January 20, 1985. An equal opportunity employer.

NASA

National Aeronautics and Space Administration
Ames Research Center
Moffett Field, California 94035

Graduate Fellowships/University of Oklahoma

The School of Geology and Geophysics offers fellowships for Ph.D. study in each of the following broad disciplines: (1) earth and planetary sciences; (2) formation and tectonic evolution of continental lithosphere, including geophysical properties and processes, including organic and inorganic diagenesis, evolution of hydrocarbons, and correlation using biostratigraphic methods. Average fellowship stipend is \$10,000 per year and is renewable annually on a non-exclusive basis. Fellowships are awarded on a competitive basis. The position is to be filled by September, 1985. Closing date for applications is December 31, 1984. Applicants should send curriculum vitae, a statement of research interests, and a list of references to: Prof. Robert D. Hatcher, Jr., Department of Geology, University of Oklahoma, Columbia, SC 29208.

The School of Geology and Geophysics presently consists of 18 full-time faculty. Research facilities in geologic geochronology laboratory; computer automated X-ray diffraction and fluorescence equipment; atomic absorption and neutron activation analysis equipment; scanning electron microscope with energy-dispersive analysis; transmission electron microscope; fission-track dating laboratory; fluid inclusion microthermometry laboratory; 2 kb hydrothermal pressure vessel for phase equilibrium experiments; high-pressure cell for mineral synthesis; petrographic laboratory with a cryogenic magnetic field and thermal and AF demagnetization apparatus; 24-channel and 192-channel digital seismic recording systems; a VAX 11-780 computer with high-resolution graphics and image display terminal; and a 30,000 volume geology and geophysics library located in the department.

For further information on faculty and active research projects, contact: Kevin Crowley, School of Geology and Geophysics, University of Oklahoma, 850 Van Vleet Oval, Norman, OK 73019.

Sedimentology/University of Utah. The Department of Geology and Geophysics at the University of Utah seeks applicants for a tenure track faculty position in sedimentology at the assistant to associate professor level. Applicants with backgrounds and specialties in sedimentary geology, sedimentary petrology, sedimentary geology, and sedimentary geology are preferred. The individual will be expected to teach undergraduate and graduate courses and to pursue an active research program with graduate students. A sedimentary geology laboratory with a VAX 11/780, PDP array processor, plotters, and processing and seismic interpretation software is available. The successful candidate will be expected to develop a research program in sedimentary geology. Current research in sedimentology includes: earthquake research utilizing a PDP 11-70 computer; monitoring of the intermountain seismic belt by an 88 station teleseismic network utilizing an on-line PDP 11-34 computer; major experiments in seismic refraction and reflection profiling for crustal structure; and allied research in tectonophysics. The faculty in an interdisciplinary program of tectonics, sedimentology and petroleum exploration. The geophysics and geology departments have active research programs in tectonics, sedimentology, and geophysics. The department has completed the PhD degree. Courses to be taught include: undergraduate structural geology as well as courses in structural analysis, tectonics, or other areas of research activity. He or she additionally will be expected to develop a vigorous program of sponsored research and to direct graduate student research projects at the MS and PhD level.

Please send complete resume and the names of at least three references to V.V. Cawver, Search Committee Chairman, Department of MEAS, North Carolina State University, Raleigh, NC 27695-8808, or by calling 919/443-8995. Applications should be submitted on Standard Form 171. Closing date for applications is 12-10-84.

Department of Commerce is an equal opportunity employer. U.S. citizenship required.

Faculty Position in Structural Geology/Tectonics. The Department of Marine, Earth and Atmospheric Sciences, North Carolina State University, has a tenure track opening at the Assistant or Associate Professor level in the area of structural geology/tectonics. The position will be filled for the beginning of the Fall 1985 term. The department can offer a Ph.D. degree in structural geology/tectonics and geophysics.

The successful applicant will be expected to have completed the PhD degree. Courses to be taught include: undergraduate structural geology as well as courses in structural analysis, tectonics, or other areas of research activity. He or she additionally will be expected to develop a vigorous program of sponsored research and to direct graduate student research projects at the MS and PhD level.

Duke University/Structural Geology. The Department of Geology invites applications for a senior-level tenure track faculty position in structural geology. We are seeking an individual with a proven research record and strong leadership in his/her field. The Department has active research programs in geophysics, sedimentology, geochronology, igneous petrology, paleontology, marine geology, and paleogeography. Graduate programs for both the MS and PhD degrees are offered. Applicants should send a curriculum vitae and names and addresses of six references. The position is to be filled by September, 1985. Closing date for applications is December 31, 1984. Applications should be sent to: Chairperson, Search Committee, Department of Geology, Duke University, Box 7720, Durham, NC 27708.

Duke University is an equal opportunity/affirmative action employer.

Satellite Altimetry/Department of Commerce, National Oceanic and Atmospheric Administration (NOAA). The National Oceanic and Atmospheric Administration (NOAA) is seeking an individual with a proven research record and strong leadership in his/her field. The Department has active research programs in geophysics, sedimentology, geochronology, igneous petrology, paleontology, marine geology, and paleogeography. Graduate programs for both the MS and PhD degrees are offered. Applicants should send a curriculum vitae and names and addresses of six references. The position is to be filled by September, 1985. Closing date for applications is December 31, 1984. Applications should be sent to: Chairperson, Search Committee, Department of Geology, Duke University, Box 7720, Durham, NC 27708.

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Ph.D. Fellowship/Louisiana State University. Applications are invited from prospective Ph.D. students in all fields of geology and geophysics for fellowships in the Department of Geology, Louisiana State University. The stipends, provided by Arco, Exxon, and the L.S.U. Alumni Endowment, range from \$10,000 to \$12,500 per year. Fellowships are made on an annual basis and are renewable for up to three years. The number of these fellowships is a function of tuition and fees to about \$100 per semester.

Applicants (this must include GRE scores, and three letters of recommendation) must be received by March 15, 1985. For the latest information, contact: Michael Garcia, Assistant Director of Graduate Studies, Louisiana State University, Baton Rouge, LA 70803-4101.

Louisiana State University is an equal opportunity/affirmative action employer.

The Johns Hopkins University/Paleontologist. The Department of Earth and Planetary Sciences invites applications for a tenure-track faculty position, effective July 1, 1985, but a paleontologist whose research will strengthen the link between paleontology and sedimentology programs. The appointee will be expected to develop an innovative research program, and to teach and supervise undergraduate and graduate students and the supervision of doctoral candidates.

To apply, send curriculum vitae, publications list, and the names of at least three references to: Dr. John H. Perry, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, MD 21218, U.S.A. The application deadline is January 15, 1985.

The Johns Hopkins University is an equal opportunity/affirmative action employer.

Geochronology/University of Hawaii. Hawaii Institute of Geophysics and Department of Geology and Geophysics invite applications for a tenure track position in geochronology. The position is a joint one between the Institute and Department, and will be filled at the level of Assistant Professor or Associate Professor. The purpose of the appointment is to support teaching and research programs in volcanology and petrology, and preference will be given to applicants with a record of research in one or more fields from among: trace element geochemistry, experimental studies in petrology, and field or experimental studies of hydrothermal alteration of rocks. The appointee will be expected to teach graduate and beginning graduate students, to contribute to the offering of introductory-level courses as well as to graduate courses in the appointee's specialty, to pursue an active research program, to guide graduate students, and to interact with faculty and staff as appropriate.

A letter of application, with resume, bibliography, and names and addresses of three persons willing to submit letters of recommendation, should be sent to: Geochronology Search Committee, Attn: Michael Garcia, Hawaii Institute of Geophysics, University of Hawaii, Honolulu, Hawaii 96822. The appointment will commence July 1, 1985 or at applicant and us.

We encourage applications from women and members of minority groups. The University of Hawaii is an equal opportunity employer.

Faculty Position. The Department of Earth and Planetary Sciences, SUNY Stony Brook invites applications for a tenure track faculty appointment. Rank and salary will be dependent on qualifications. Areas of specialization are open but preference will be given to applicants whose research interests complement those of the department. The successful candidate must have a Ph.D., a demonstrated research and teaching record, and an interest in teaching graduate and undergraduate students. Qualified persons should send a resume and arrange for three references to be sent to: Dr. G.N. Hanson, Chairman, Department of Earth and Planetary Sciences, SUNY Stony Brook, Stony Brook, NY 11794-2100.

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Faculty Position. The Department of Earth and Planetary Sciences, SUNY Stony Brook invites applications for a tenure track faculty appointment. Rank and salary will be dependent on qualifications. Areas of specialization are open but preference will be given to applicants whose research interests complement those of the department. The successful candidate must have a Ph.D., a demonstrated research and teaching record, and an interest in teaching graduate and undergraduate students. Qualified persons should send a resume and arrange for three references to be sent to: Dr. G.N. Hanson, Chairman, Department of Earth and Planetary Sciences, SUNY Stony Brook, Stony Brook, NY 11794-2100.

SUNY Stony Brook is an affirmative action/equal opportunity employer and employer. AK9300-84.

Ph.D. Fellowship/Louisiana State University. Applications are invited from prospective Ph.D. students in all fields of geology and geophysics for fellowships in the Department of Geology, Louisiana State University. The stipends, provided by Arco, Exxon, and the L.S.U. Alumni Endowment, range from \$10,000 to \$12,500 per year. Fellowships are made on an annual basis and are renewable for up to three years. The number of these fellowships is a function of tuition and fees to about \$100 per semester.

Applicants (this must include GRE scores, and three letters of recommendation) must be received by March 15, 1985. For the latest information, contact: Michael Garcia, Assistant Director of Graduate Studies, Louisiana State University, Baton Rouge, LA 70803-4101.

Meetings (cont. from p. 1189)

studies with these satellites should include examination of the variability of the Antarctic circumpolar current, interactions between ocean waves and sea ice at the ice edge, and changes in the ice shelf/ice shelf margins. Ultimately, a laser altimeter may be required on future satellites to determine whether the ice sheet is growing or shrinking. Detection of changes in surface elevation by satellite altimetry is the only way to measure changes in ice volume. For these altimeter studies the orbit of the satellite must be known precisely, and satellite tracking in the Antarctic contributes data needed for this purpose.

Synthetic Aperture Radar devices on polar orbiting satellites can give images of the ocean surface that are valuable for determining wave properties and sea ice type and motion and for the routing and navigation of ships. Also, radar imagery would be extremely useful for mapping the land ice in a similar manner to that done with Landsat data but without the impediment of cloud cover. Although satellite radar imagery has not yet been used in the Antarctic, future satellite missions planned by several countries should provide this capability if a suitable readout station in the Antarctic, an adequate on-board recording facility, or a satellite data relay is provided.

Satellites have aided glaciological research in other ways. The radio signals from polar-orbiting navigation satellites such as Transit and the new Global Positioning System, recorded at several sites on a moving ice sheet, give not only the velocity of the ice flow but also the strain or deformation of the ice. Such data are needed for modeling and understanding the ice flow dynamics.

The Magik satellite measured the earth's magnetic field accurately in 1979. The data have been used to locate magnetic anomalies on the earth's surface and to identify the boundaries between tectonic plates and other prominent geologic structures. A Geopotential Research Mission (GRM) carrying extremely sensitive accelerometers or other sensors to investigate anomalies of the earth's gravitational field as well as the magnetic field is now being considered. Determination of the geoid in the Antarctic region is of interest. For studies of the earth's structure and the calculation of precise satellite orbits for altimetric measurements.

In meteorological and radiation budget studies, satellite observations can contribute significantly to the World Climate Research Program in two distinctly different ways. First, meteorological data can be automatically collected and transmitted in near real time from remote regions of the world to weather

analysis and forecasting centers via the French ARGOS system or via satellites in geostationary orbit. Second, the dynamics of the atmosphere and the earth's radiation balance can be investigated. For example, the genesis and motion of major storms can be studied by examining sequential images of developing cloud systems in different spectral bands. The amount of infrared radiation coming from the earth and its atmosphere has been well studied from space by using radiation sensors. The emitted radiation is analyzed to give information on the distribution (height, latitude, and longitude) of trace atmospheric species, such as ozone, and the oxides of nitrogen and methane. Satellite observations of the atmosphere, oceans, and cryosphere from space are contributing vital new information on the many complex feedback processes involved in determining the world's climate.

Analysis of the color of the ocean surface, as measured from the Nimbus 7 satellite, has revealed variable concentrations of chlorophyll in the ocean, and thus variable concentrations of phytoplankton. The color data show ocean eddies and other flow patterns, such as meanderings of the circumpolar current. Not only is such information useful in studying ocean dynamics, but it can also be used to locate concentrations of fish suitable for harvest and, in the southern ocean, regions containing phytoplankton-feeding krill. Since this information on the biological productivity of the oceans is essential to manage the ocean's living resources properly, it is highly desirable that ocean color scanner be placed aboard another polar-orbiting satellite in the near future.

The various uppermost atmosphere, at heights above 100 km, can best be studied by using observations made from space combined with those from the ground. The aurora australis and aurora borealis observed in the polar regions provide spectacular visible displays of the effect of energetic solar events on the earth's environment. After a solar flare, energetic charged particles and high-speed streams of solar wind disturb the earth's magnetosphere, which is the ionized region of geospace field lines surrounding the earth. Motions of electrically charged particles are generated in the ionosphere at the base of geomagnetic field lines extending from the distant regions of the magnetosphere. These ionospheric disturbances along the neutral atmosphere at speeds of several hundred meters per second. Because in the Antarctic the magnetic pole is twice as far from the geographic pole as it is in the Arctic, effects of the ionospheric disturbances in the neutral atmosphere are observed to be more dramatic than in the northern hemisphere. Consequently, the effects are more evident, readily studied, and understood in the south than in the north. This has practical consequences because after increased solar activity the disturbance ionosphere in polar regions adversely affects radio communications. Furthermore, enhanced geomagnetic activity during solar terrestrial events interferes with aeromagnetic surveys being conducted for hydrocarbon and mineral exploration.

For the future, there is great potential for extending these significant observations, especially if space-borne and ground-based programs are planned as parts of international programs of polar research. New technology is now available for studying the earth's land, ocean, and ice surfaces and the ionosphere from ground level out to the interplanetary medium. The potential and results of the new technology for interdisciplinary studies of the polar regions has been described in the COSPAR meetings and in other scientific reports. Global climate, for example, is particularly sensitive to processes operating in the polar regions and much-needed aeromagnetic climate research is planned within the World Climate Research Program. The upper atmosphere at high latitudes, where energy from the solar wind and the magnetosphere is deposited, will be studied as part of the International Solar-Terrestrial Physics program proposed for the 1990s.

During the latter part of this decade, several remote sensing missions are planned in different countries. The space shuttle launched from Vandenberg Air Force Base in California can also carry in situ observing and remote sensing instruments into the all-important polar orbit. In the next decade the Polar Platform component of the U.S./International Space Station program will be able to carry large instruments of advanced design into polar orbit for multidisciplinary studies. Systems will be needed to transfer the large amounts of space data to computers for detailed analysis and interpretation by scientists in several countries. In the meantime, data already obtained should be made widely available, and the resources and techniques necessary for their processing, full analysis, and interpretation should be dedicated. The keys that are needed to unlock many significant scientific problems that are of global concern and importance are to be found in the earth's polar regions.

This report was contributed by M. J. Rycroft, of the British Antarctic Survey, Cambridge, U.K., and J. J. Zavaly, of NASA's Goddard Space Flight Center, Greenbelt, MD; they were the conveners of the Symposium on Satellite Observations of the Antarctic: Past, Present, and Future.

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This item was contributed by Constance Santocchia, Lamont-Doherty Geological Observatory of Columbia University, Palisades, N. Y.

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